DOCUMENT RESUME

ED 236 352 CE 037 398

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TITLE Keyboarding: The State of the Art.
INSTITUTION Virginia Polytechnic Inst. and State Univ., Blacksburg.
PUB DATE Oct 83
NOTE 25p.; Prepared for the project "Using the Microcomputer to Teach Keyboarding Skills."
PUB TYPE Viewpoints (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Behavioral Objectives; Business Education; *Business Skills; *Computer Assisted Instruction; Computer Programs; *Microcomputers; Office Occupations Education; *Teaching Methods; *Typewriting
IDENTIFIERS *Keyboarding

ABSTRACT

Keyboarding differs from typewriting in the basic purpose it serves. Keyboarding is the act of entering alphanumeric data on a keyboard of information processing equipment for the purpose of obtaining or communicating information. The target populations for keyboarding are those whose typewriting skill will be primary to their vocations, those whose skill will be secondary to their vocations, and those who will use typewriting for personal use. A consensus among educators is that keyboarding skill development should take place at middle and high school levels and not be limited to business students. Business teachers should be responsible for the teaching of keyboarding through microcomputer course offerings. Software for keyboarding skill development is available, although teachers can develop materials from typewriting textbooks. Advantages of teaching keyboarding with microcomputers include immediate feedback, lack of embarrassment when mistakes are made, lack of subjective teacher evaluation, flexibility of scheduling, and freeing the teacher from time-consuming tasks. The growing use of keyboards in business, industry, government, and education has made efficient use of them a basic skill in American society. (Competencies to be met by the student learning to keyboard are listed.) (YLB)

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ED236352

KEYBOARDING

THE STATE OF THE ART

Prepared for

"Using the Microcomputer to Teach Keyboarding Skills"

Project No. VA-84-C-131-3-BE-001

by

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October, 1983

CE037398

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KEYBOARDING
THE STATE OF THE ART

Erickson (1983) states, "Almost daily, new technological hardware and software is appearing. Our problem becomes one of how to use such equipment efficiently and effectively. If we do not learn to use and apply newly available electronic tools in a relatively short period of time, we risk obsolence" (p. 5). Interestingly, use of most electronic information processing equipment and its accompanying software requires input via a keyboard. A keyboard is the typical configuration found on a typewriter. Thus efficient and effective use of the equipment begins with keyboarding skill. Olinzock (1982) emphasizes this points as follows: "Typewriting is a skill more in demand today than ever before. Because of its many applications, basic keyboarding skill is necessary for all business students. The input devices of almost every piece of automated equipment used for information management resemble the standard typewriting keyboard" (p. 36c).

Nathan (1983) sums up the importance of keyboarding skill by stating, "Knowing how to build or ride a horse were basic skills 150 years ago. Looking to the future, typing (or keyboarding) is a twenty-first century basic skill" (p. 35).

What is Keyboarding?

In examining the state of the art for keyboarding, it is important to define what is meant by keyboarding and how it differs from the traditional skill of typewriting. Although from the same parentage, keyboarding and typewriting are not synonymous. The basic difference stems from the purpose of each. Keyboarding is the act of entering alphanumeric data on a keyboard

of information processing equipment for the purpose of obtaining or communicating information. Typewriting produces a formatted document, referred to as hard copy. This difference does not mean, however, that typewriting skills are not applicable to keyboarding. Blue (1983) feels that the techniques for teaching both are the same. Halpern (1983) agrees, saying, "Although ideally a keyboarding course should be taught on a computer or word processor, it may be taught successfully on a traditional typewriting keyboard" (p. 34).

What Target Populations Exist for Keyboarding?

Recognizing that keyboarding has become an essential function in processing information, what group or groups should be taught this important skill? Although there appears to be some disagreement as to how early students should be exposed to the teaching of keyboarding, business educators as well as others do agree that it is no longer a skill needed only by business students. As Goodrich (1979) states:

> Gone are the days when the typewriting course was designed primarily to prepare women for secretarial jobs. Today's keyboarding course must prepare men and women for their careers, any one of which may have a typewriter-like keyboard in it. The growing use of keyboards in business, industry, government, and education has made them the tools for many future careers. (p. 16)

Keyboarding skill is already needed for many jobs. For example, to function effectively in their jobs all of the following individuals need keyboarding skills: the records manager who uses the computer terminal to locate specific documents in the file; the inventory clerk who keeps track

of shipments of stock and receipt of new stock via the computer terminal; the airline agent who uses the computer terminal for reservations, passenger check-ins, and seat arrangements; and the business executive who has a computer terminal on the desk to access current information which will be useful in making managerial decisions.

Simcoe (1980) suggests that keyboarding should be offered to three different audiences: 1) those individuals whose typewriting skill will be primary to their vocations, 2) those whose typewriting (keyboarding) skill will be secondary to their vocations, and 3) those who will use typewriting for personal uses. The first group will need typewriting techniques that are common to electronic word processing since their primary jobs depend on typewriting skills. They must know proper formatting styles, placement, rules of punctuation, grammar and spelling, as well as expert keyboarding techniques. The second group is most likely to be individuals who hold executive and managerial positions. They will need a keyboarding skill that allows them to quickly enter messages using their desk top terminals. This group will not be concerned with formatting and placement of hard copy. The last group will consist of individuals who wish to extend their keyboarding skills so that they can do their own correspondence, report preparation, and financial documents. This group will need to have only the most basic formatting and text editing capabilities.

If a need exists for keyboarding skill, at what age does training for the skill begin? Some feel it should begin at the kindergarten level. Rauch (1982) provides reasons for early development of keyboarding skill. He notes:

> First graders and kindergarteners are shamelessly "hunting and pecking" their way through various microcomputer programs. Likewise second through sixth graders have also joined the

> ranks of "hunters and peckers." Unfortunately these "little people" have little knowledge about correct keyboarding techniques and their importance. As business educators, we must realize the eventuality of such early beginnings and the implications for us when these youngsters reach our keyboarding classes. (p. 19)

Stewart and Jones (1983) support Rauch in stating, "Keyboarding needs have now obviously expanded to include elementary school children, who under current practices have inadequate habits of operation by the time they reach junior high typewriting classes" (p. 11).

Others indicate, however, that teaching keyboarding skill in the elementary school is not a practical approach. Although they agree that children of elementary school age could learn keyboarding, they feel the skill learned would not be used with any regularity, making retention doubtful. They also point out that with a schedule already full it would be next to impossible to teach keyboarding on a regular basis in elementary grades.

There does appear to be a consensus among educators that keyboarding skill development should take place at middle and high school levels and that it not be limited to business students. Hanson and Rigby (1981) believe that students need keyboarding skill to interact with computers as part of their academic program. Ownby and Perreault (1983) further state, "Is keyboarding a futuristic topic? Hardly. Students in many curriculums, but particularly in business, interact regularly with keyboards as more and more classes provide computer usage as a problem-solving tool. Keyboarding is a relatively new course in the business curriculum. Even though it is not a complex course, it represents a skill that every (college) graduate needs" (p. 9).

Who Teaches Keyboarding and How?

Because keyboarding is an essential part of our educational curriculum for every student, it becomes necessary to decide who will teach it and in what manner.

Dickey-Olson (1982) issues this warning, "Too many (business) teachers are turning up their noses at the chance to teach keyboarding. They do not want to be bothered with developing new lesson plans, going to the trouble of team teaching, or opening their eyes to the fact that once again part of the business education curriculum is going to be taken away from them" (p. 11). She believes that it is important for business teachers to be responsible for the teaching of keyboarding and suggests the following options: 1) Make administrators aware of the importance of the keyboarding situation; 2) Offer a microcomputer course directly after a typing course; 3) Teach a microcomputer course yourself; 4) Insist that any elementary teacher attempting to teach a microcomputer course be trained in the proper methods and techniques of keyboarding and be certified to teach keyboarding/typing.

One way to provide keyboarding skill development is through computer-assisted tutorial packages designed to teach keyboarding skill. Sunkel and Cooper (1982) reporting on the use of such a package note that:

> 1) It prepares students for the electronic office, 2) it virtually eliminates the tedious task of grading papers, thereby providing the teacher with more time to review student progress and assess needs, 3) it provides more consistency and accuracy in grading, and 4) from the viewpoint of both the teacher and the student, it makes learning a skill easy and pleasurable. (p. 21)

Although teachers generally are positive about using computer-assisted packages, Alexander and Dickey-Olson (19[illegible]) express concern that these same teachers may not be qualified to teach keyboarding skill. They note, "The only teachers certified to teach typing and keyboarding are business education majors and minors. Yet, it would appear that an unknown number of teachers who are not certified to teach typing or keyboarding are presently using computer-assisted tutorial packages to teach these skills" (p. 5).

Robinson (1982), too, stresses that the microcomputer has its limitations.

> It can do only what it has been programmed to do. The microcomputer cannot see; so it cannot observe the student at work and make appropriate suggestions for improved learning behavior. Only a human can do that. The microcomputer cannot hear; therefore, it cannot answer the student's call for help. Only a human can do that. The microcomputer cannot "feel" so it cannot assess and accomodate itself to learning problems that derive from the motives, emotions, and attitudes in the "human condition." Only a human can do that. Thus, the microcomputer is a teaching/learning "tool." It cannot replace a well-prepared, interesting and interested teacher. (p. 231)

Schools are also faced with the problem of furnishing the equipment, time, and space for keyboarding instruction. School systems are considering different approaches to teaching keyboarding. For example, Stewart and Jones (1983) report that in Lincoln, Nebraska, four options are being considered for delivering keyboarding instruction to elementary students.

These options are:

1) Elective courses in summer school. Last summer one keyboarding course was offered at one school for six weeks, one hour a day; next summer the course will be expanded to include three other schools.

2) Evening or late classes at the high school. These sessions could be at 5:00 p.m. or after dinner at 6:30 p.m.

3) Use of senior high facilities at other times. In some cases typewriting rooms are available from 8 to 8:30 or from 12 noon to 1 p.m. By running half-hour sessions in the early afternoon, large numbers of students could be accomodated. This option as well as option no. 2 has the advantage of school occupancy when high school students are not in the building.

4) Taking the machines and teacher to the elementary school. This is the most complex option and would require a travelling teacher as well as the purchase of a room of electric typewriters or microcomputers.

Another option is to furnish elementary and middle schools with enough microcomputers for each child to have access to a computer at a given time. Business teachers, if they are to teach keyboarding, must then be certified to do so in kindergarten through twelfth grade. Another possibility suggested by Alexander and Dickey-Olson (1983) is to require elementary teachers not certified to teach typewriting to take courses in methods of teaching keyboarding either in workshops or summer graduate courses.

Regardless of the option used for delivery of keyboarding instruction at the elementary level, it is generally agreed that a spirit of cooperation between elementary and secondary teachers is important in providing the instruction. Teachers in elementary schools in Omaha, Nebraska, responding to a study examining keyboarding conducted by Rauch and Yanke (1982), expressed a willingness to assist with curriculum development and planning. The researchers state, "When asked who should teach the class, intermediate teachers (grades 4-6) favored the high school teacher in the lead position. Primary teachers (grades K-3) preferred the elementary classroom teacher at the

helm--provided assistance would be available from a business teacher. Everyone concurred that a team-teaching approach could result in the most significant gains" (pp. 19-20).

Robinson (1983) reports from case study observations that:

1) a microcomputer system is a viable means of providing instruction. Performance scores attained using this medium compare well with those of students under group instruction.

2) students in a teacher-as-tutor mode and those in combination of micro-tutoring followed by the teacher-as-tutor and textbook mode appear likely to perform better than those taught by micro-tutoring alone.

3) in keyboarding learning, students tend to fall into one of three categories in terms of keystroking technique: "strikers," "pushers," or "mashers." Microcomputers seen to encourage pushing or mashing keystroking motions. Alternative practice on the micro with practice on the electric typewriter seems to correct this weakness.

4) a strictly visual approach to learning to keyboard (as represented by a micro delivery system) fails to take advantage of the desired and desirable auditory feedback given by the key striking the electric typewriter platen. Practice on the typewriter following the micro lesson supplies this immediate feedback and reduces pauses.

5) it seems likely that the human mind with its own feedback mechanisms does not require external feedback for every response; otherwise a micro program such as the one used here would have produced higher performance scores than those produced by the other two strategies in which only intermittent feedback was provided.

6) keyboarding, however taught, should be presented on the assumption that the students may use either the typewriter or the microcomputer or both at one time or another. (p. 12)

In contrast to the findings reported by Robinson, Sunkel and Cooper (1982) report a favorable response to teaching keyboarding solely by the microcomputer method. They state:

> Instant feedback and evaluation have been major motivating factors in the popularity of this method. The typist is active in the learning process, and goals can be easily

> adjusted to individual student needs. Thus, a very positive student attitude exists. Students using the system want to spend more time than usual and do not complain about the tedium of additional practice. (p. 20)

Lindsay (1982) notes that the microcomputer is as effective as the electric typewriter in increasing student speed levels and accuracy scores, considering factors of sex, age, and class attended. These findings indicate that teaching keyboarding on the microcomputer has both advantages and disadvantages. One solution might be, as Robinson (1983) suggests, to combine the teaching of keyboarding on the microcomputer with the teacher-as-tutor and textbook mode.

What Materials and Equipment Can Be Used?

This section examines equipment and material that can be used for the teaching of keyboarding.

Equipment

With the recent flood on the market of hardware and software products, it is important to consider what equipment and materials are both effective and economically feasible for teaching keyboarding.

Halpern (1983) states:

> Ideally a keyboarding course should be taught on a computer or word processor, but it also may be taught on a traditional typewriting keyboard. Many keyboards make provisions for ten-key pads for recording numerical information. If ten-key pads are unavailable, statistical typing may be taught on a conventional typewriter by designating a group of keys to be simulated as numbers. Or, the student may obtain the necessary skills on a ten-key adding machine or calculator. (p. 34)

In a classroom where microcomputers are furnished, the microcomputers would have the standard typewriter like keyboard and the ten-key keyboard. The output would come via a computer printout, a screen, or an ink jet printer. Post (1982) notes that every microcomputer system needs 1) a central processing unit to do the actual computing, 2) memory available in two general forms: read only memory (ROM), containing some of the software necessary to run the microcomputer, and random access memory (RAM), used by software for temporary storage of information. The more RAM available, the more information a microcomputer can handle at one time. Each system must also have an input and output device. A final important item is a mass storage device such as a disk drive.

Post adds that with another system a "host" computer with at least one disk drive and a network controller makes it possible for a classroom teacher to upload (send) and download (receive) programs to/from as many as 16 student work stations. Also, controllers can be cascaded (connected in series) to accomodate more work stations, or two or more network systems can be used to provide multiples of the 16 + 1 configuration (16 student stations plus host, which can also be used as a student station). Through such a system, students' work can be stored at the host station via disk or printed on a printer if hard copies are desired.

In an experimental setting, Lindsay (1982) provided a treatment group with Commodore PET microcomputers having 40 character lines of print on a video display terminal. The results of the experiment showed that Commodore machines were as effective as electric typewriters for teaching keyboarding but displayed the following weaknesses:

1) The short line length of 40 characters which necessitated truncation of the original practice lines, which were 60 characters in length. (Since the study new machines featuring an 80 character line have been designed by Commodore.)

2) The RUN/STOP key was too close to RETURN key.

3) Loading the keyboarding program via tape proved too slow.

On the positive side:

1) The screen appeared to be an optimal distance from the user.

2) The screen was easy to read and was bright enough in this well-lighted classroom.

3) Flicker-free, green upper and lower case letters were less tiring than white letters on a black screen.

4) The keyboard was the same height as typewriters.

5) All components were in a single housing with a minimum of cables.

6) Equipment breakdown was confined to one tape unit during the four week period.

From the study, Lindsay drew the following conclusions that he felt applied to all computer hardware used to teach typewriting, regardless of the manufacturer.

1) All microcomputers should have 32,000 characters of memory.

2) All microcomputer video screens should have an 80 character line length.

3) All microcomputers should have a keyboard design similar to that of the IBM electric typewriter.

4) All microcomputers should have a disk feature for loading.

Regardless of the hardware chosen for keyboarding, cost efficiency will be important. It is often assumed that furnishing classrooms with computer equipment is not economically feasible. Wallace (1981) disgrees, saying, "Economically it is feasible to equip and maintain the modern keyboarding classroom with terminals or microcomputers at a cost equal to or less than equipping it with conventional typewriters" (p. 27). He cites as examples Radio Shack's TRS-80 Model III, with 16-K RAM which retails for $999. With educational discount the Model III can range from $800 to $900. This is competitive

with electric typewriters since the school price for IBM Selectric I is currently around $600 and the Selectric III starts at $900. It also stands to reason, he points out, that since we are dealing with a configuration that is primarily electronic with very few mechanical parts involved, such equipment should last longer than conventional mechanical equipment. And since the equipment is software programmed, it is always "upwardly compatible," and will not become obsolete.

Materials

Software materials that are effective and practical for use with the hardware chosen must also be considered. In a study conducted by Schmidt and Stewart (1983) six programs were obtained that could be used on either a TRS-80 Model III or an Apple II Plus microcomputer. They documented some of the weaknesses of the six programs as being: 1) only upper-case letters are taught, 2) limited vocabulary is presented in the practice material, 3) too much nonsense material is used, 4) the learner is under too much pressure to beat time allowance and to perform perfectly, 5) exit from one lesson to enter another within a program is difficult, and 6) manuals or documentation that accompany programs are inadequate. On the positive side, they found some strengths of the particular programs to be that 1) a variety of microcomputer capabilities were used, 2) keys were presented on the screen in a clear and logical way, 3) programs could be adjusted to each student's skill level, 4) immediate feedback was provided, 5) students could increase speed and accuracy through practice drills, and 6) a teacher mode existed whereby the instructor could edit or add material.

Lozy (1981) who is not a business educator, reviewed three programs for the Radio Shack TRS-80 computer. The three programs, Microsoft's Typing Tutor, Hayden's Microtyping, and Level IV's Touch Typing are all different but have

several features in common. They are on tape cassettes, have some kind of scorekeeping, have an alphabetic stage and a word stage, are written in BASIC for the ubiquitous TRS-80 Model I, Level II computer with 16 K bytes of memory, and have adequate built-in instructions. He evaluates the effectiveness of the three programs as follows:

> Both the microtyping and Typing Tutor programs are excellent and provide a good introduction to typing. I think Typing Tutor is better in the initial stage, teaching the layout of the keyboard. That, however, is a one-time task, and what really matters is the performance of a program in going beyond that. Here again, Typing Tutor wins out over the ummodified Microtyping. But someone with a minimal knowledge of BASIC could modify Microtyping to make it better than the unmodifiable Typing Tutor. Finally, while Touch Typing is useless, I do find myself using Touch Typing II to practice long and difficult words. (p. 39)

New software for keyboarding skill development is being developed and marketed at a rapid pace. Dickey-Olson (1981), however, suggests that computer software for keyboarding instruction may not be necessary. She notes that "Any typewriting textbook is suitable for a course such as this" (p. 92). She adds that teachers will need to develop additional materials to use in conjunction with the textbook in order to incorporate ten-key pad drills, as well as to familiarize the students with computer language, coding abbreviations, and basic business vocabulary.

What Are the Advantages of Teaching Keyboarding with Microcomputers?

Although it is generally agreed that a live teacher is still the ideal model for teaching keyboarding, the microcomputer animated model is the nearest

anyone has come to the "real thing" electronically. The computer is a one-on-one tutor and some definite advantages to using it for keyboarding instruction can be identified. Robinson and Johnson (1982) suggest that advantages to the student are as follows: 1) The microcomputer is an ideal instrument for providing immediate feedback which is important in skill learning where knowledge of results in the form of confirmation and correction tactics is vital to successful performance, and 2) The computer/one student learning system is impersonal in some ways, thus eliminating the embarrassment of failure that often results when student performance is evaluated by a person during the formative stages of a skill.

D'Souza (1983) agrees, saying, "The educational promise of microcomputer-assisted instruction in keyboarding lies in its ability to individualize and personalize the instructional process" (p. 11). She lists four important features: 1) immediate feedback, 2) lack of embarrassment when mistakes are made, 3) lack of subjective evaluation by the teacher, and 4) flexibility of scheduling as the most important aspects of using a microcomputer. Wallace (1981) suggests still another benefit, ..."above all, it can provide two character traits which many of us humans fall short on--unlimited patience and tolerance. It can repeat instructions endlessly until the student finally obtains comprehension" (p. 28).

Not only can the student benefit from using microcomputer-assisted instruction to learn keyboarding, the teacher can be freed from time consuming tasks, thus giving more time to assess student needs and progress. Clark (1978) notes, "When the individualized instruction plan was first implemented sans computer, it was found that the instructor needed to be superhuman to keep up with the flow of events--issue student work, suggest study sources, evaluate work, prepare and administer individualized tests, and inform students of their progress" (p. 28). With the use of the microcomputer, individual

progress and performance records and scores can and should be computerized to give frequent feedback to students and to save the instructor time. Ownby and Perreault (1983) reporting on their keyboarding classes noted that the program used provided for considerable feedback, but tests also could have been administered and scored on the computer, and instruction/practice time on the computer could have been computerized rather than using a sign-up system.

What Competencies Should Be Achieved?

Since the concept of teaching keyboarding as an essential part of the curriculum is a relatively new one, what should be taught in such a course has been a matter of opinion. However, those expressing opinions (Alexander & Dickey-Olson, 1983; Beaumont, 1981; Clark, 1978; Hanson & Rigby, 1981; Ownby & Perreault, 1983; Robinson & Johnson, 1982) appear to agree that the following competencies should be met by the student learning to keyboard:

1) Demonstrate correct "touch" system techniques for operating the alphanumeric keys of a keyboard by showing the correct hand and body placement at the machine and efficient finger movements.

2) Demonstrate the correct "touch" system techniques to be used on a ten-key numerical pad by showing correct hand and body placement at the machine and efficient finger movements.

3) Demonstrate knowledge of the key locations by correctly entering information from new copy without looking at either the hands, the screen, or the finished copy. (Note: Some individuals disagree here, suggesting that some visual reinforcement should be permitted and, indeed, may be necessary when applications require use of at least two fingers simultaneously.)

4) Produce a straight-copy speed of 30 words per minute with an accuracy level of not more than two errors per minute. (Speed requirements may vary according to grade level of student and length of course.)

5) Demonstrate the ability to proofread accurately from copied material, recognizing and using appropriate proofreader's marks.

6) Demonstrate the ability to backspace and correct errors by producing copy with all errors restruck.

7) Demonstrate the ability to follow oral and written directions by completing assignments given in both media by the instructor.

8) Demonstrate an understanding of the basic vocabulary and concepts used in keyboarding operations for inputting and retrieving information.

9) Demonstrate proficiency in keyboarding technical input including BASIC, FORTRAN, and COBOL programs and data base information.

Keyboarding courses currently are offered in different formats, according to the individual needs of the students and/or the schedules of the schools offering the course. A resource guide prepared by the Minnesota Curriculum Services Center (1983) suggests that the entire course should take approximately 20-30 hours over a six-weeks period. Class time may range from 30-50 minutes each day. The lower the grade level, the shorter each class period should be. In their offering at the collegiate level, Ownby and Perreault (1983) listed the following schedule. "Students were required to complete a total of 35 lessons. The first 25 lessons introduced, reinforced, and drilled on the alphabetic keyboard as well as provided numerous technique checks. The next 5 lessons taught the top-row number keyboard and the last 5 lessons taught the 10-key numeric keyboard" (p. 10).

Generally, use of computer-assisted keyboarding materials is recommended for relatively short periods of time. Robinson and Johnson (1982) believe this is important because beginning students cannot remain under intense learning conditions for extended periods without developing excessive fatigue and tension. When these emotional and physical states occur, continued intensive practice becomes counter-productive to skill development.

Another recommendation for offering keyboarding is that it be on a pass/fail basis. Ownby and Perreault (1983) note that students' grade-point averages are not then affected by their performance in keyboarding. Students they taught simply completed the assignments and demonstrated the ability to type at least 25 words a minute with 3 or fewer errors a minute on selected material. Students were allowed to exit the course when they met these

requirements. The Minnesota Curriculum Services Center (1983) recommendations concur, especially at the elementary school level, that the course should be taught on a pass/fail basis. The recommendation is that students who successfully complete the course be given a certificate of completion.

Ownby and Perreault (1983) report that for their collegiate offering the test scores of students who had no previous typewriting/keyboarding instruction ranged from 25 to 55 gross words a minute on timings that had three or fewer errors a minute. The class average was 34 gwam, and 62 percent typed over 30 gwm, with both of those figures including only timings having three or fewer errors a minute. They state, "All students who completed the required lessons were able to achieve at least the minimum standard of 25 gross words a minute with three or fewer errors a minute" (p. 11).

Why Teach Keyboarding?

The importance of computer technology is pointed out by the Minnesota Curriculum Services Center (1983) as follows:

> In the 1950's there were only about fifteen computers being used in the United States. By the middle 1970's, over 100,000 computers of various sizes and capabilities were being used. Today, the personal computer has invaded both our business and personal lives. Tasks that were formerly manual operations have been automated through the use of computers and other electronic equipment. (p. i)

Thus, keyboards are in all phases of our lives. Computer-based communications are no longer a concept but a reality in offices, schools, and homes and will continue to expand in the future.

Office workers will find computer tools more available and more vital in their everyday operation. Simcoe (1980) suggests that three types of communication will impact on the office of the future: 1) computer-based message systems, 2) electronic mail, and 3) computer conferencing and she notes that each of these types of communication will require that a knowledge worker input information via a keyboard terminal.

As Dickey-Olson (1982) points out:

> It may not be necessary to use a touch system, but is it the most efficient method by which to use a machine with a keyboard. Over time employers will discover that their employees with typing skills are the people doing the most efficient job. The student with the touch system keeps his/her eyes on the copy and has confidence that the work will be correct. This confidence gives that student advantage over the student who has to keep referring back to the keyboard to find the keys. (p. 11)

Simcoe (1980) agrees, stating:

> It is evident, therefore, that the skill of keyboarding has become increasingly important in schools, both as a business offering and as a problem-solving tool for other curriculums; in the business world, where computer-based communications systems are already a reality; and in the home of the future where the worker can interact with the office, the student can interact with the school setting, and the family can interact with various organizations to do personal business transactions. (p. 23)

Beaumont (1981) too, reminds us of this importance when he quotes Alvin Toffler as saying the day will come when advertisements for high-level executives will include the phrase TYPING REQUIRED.

What remains, then, is the question of how, where, when, and by whom the important skill of keyboarding will be taught. The need is obvious and the time is now notes Erickson (1983) as he warns business educators, "Our task is not an easy one. Like Alice in Wonderland, we have to run as fast as we can just to stand still. We can elect not to get involved, but if we do so, we are electing to become obsolete" (p. 9).

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